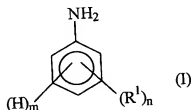


What is claimed is:

1. A process for making a polyaniline/second polymer complex comprising the steps of:

(a) forming an aqueous solution combining a plurality aniline monomers, each of the aniline monomers having Formula I below, and a second polymer having a high molecular weight, the second polymer having Formula II below:



- 15 where in Formula I:

n is an integer from 0 to 4;

m is an integer from 1 to 5, with the proviso that $n + m = 5$; and

R¹ is independently selected so as to be the same or different at each

- occurrence and is selected from alkyl, alkenyl, alkoxy, cycloalkyl, cycloalkenyl, alkanoyl, alkythio, aryloxy, alkylthioalkyl, alkylaryl, arylalkyl, amino, alkylamino, dialkylamino, aryl, alkylsulfinyl, alkoxyalkyl, alkylsulfonyl, arylthio, arylsulfinyl, alkoxy carbonyl, arylsulfonyl, carboxylic acid, halogen, cyano, or alkyl substituted with one or more of sulfonic acid, carboxylic acid, halo, nitro, cyano or epoxy moieties; or any two R¹ groups together may form an alkylene or alkenylene chain completing a 3, 4, 5, 6, or 7-membered aromatic or alicyclic ring, which ring may optionally include one or more divalent nitrogen, sulfur or oxygen atoms;

and where in Formula II:

R² is a polymeric unit selected from styrene, substituted styrene, vinyls,

- 30 vinyl aromatics, acrylates, methacrylates, and combinations thereof;

a is an integer from about 1 to about 10; and

b is a number sufficient to give a molecular weight greater than 100,000;

and

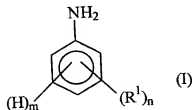
(b) adding an oxidizing agent to the aqueous solution to form a reaction mixture.

2. The process of Claim 1, wherein the second polymer is selected from
5 styrene and substituted styrene sulfonic acid polymers; sulfonated vinylaromatic
polymers; vinyl sulfonic acid polymers; sulfonated acrylate polymers; sulfonated
methacrylate polymers and copolymers on or more of styrene and substituted
styrene sulfonic acid polymers; sulfonated vinylaromatic polymers; vinyl sulfonic
acid polymers; sulfonated acrylate polymers; sulfonated methacrylate polymers.
- 10 3. The process of Claim 1, wherein the second polymer is selected from
poly(styrenesulfonic acid), poly(2-methylstyrene sulfonic acid), poly(4-
phenylstyrene sulfonic acid), and sulfonated poly(alpha-vinyl naphthalene); poly
(vinyl sulfonic acid); sulfonated poly(vinyl benzoate); sulfonated poly(benzyl
15 acrylate) and sulfonated poly(benzyl methacrylate).
4. The process of Claim 1, wherein the second polymer is poly(styrene
sulfonic acid).
- 20 5. The process of Claim 1, wherein second polymer is selected from
poly(styrene/2-methylstyrene sulfonic acid), poly(styrene/vinyl sulfonic acid), and
poly(styrene/vinyl/2-methylstyrene sulfonic acid).
6. The process of Claim 1, wherein the oxidizing agent is ammonium
25 persulfate.
7. The process of Claim 1, wherein the aqueous solution further comprises an
enzyme.
- 30 8. The process of Claim 7, wherein the enzyme is a peroxidase selected from
horseradish peroxidase and soy bean peroxidase.
9. The process of Claim 8, wherein the oxidizing agent is hydrogen peroxide.
- 35 10. The process of Claim 1, further comprising the step of:
(c) isolating a resulting polyaniline/second polymer complex from
the reaction mixture.

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11. A process for forming an aqueous dispersion of polyaniline complex, the process comprising the steps of:

- (a) forming an aqueous solution combining a plurality aniline monomers, each having Formula I below, and a second polymer having a high molecular weight, the second polymer having Formula II below:



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where in Formula I:

n is an integer from 0 to 4;

m is an integer from 1 to 5, with the proviso that $n + m = 5$; and

- 15 R¹ is independently selected so as to be the same or different at each occurrence and is selected from alkyl, alkenyl, alkoxy, cycloalkyl, cycloalkenyl, alkanoyl, alkythio, aryloxy, alkylthioalkyl, alkylaryl, arylalkyl, amino, arylsulfonfyl, dialkylamino, aryl, alkylsulfonfyl, alkoxyalkyl, alkylsulfonfyl, arylthio, alkyl substituted with one or more of sulfonic acid, carboxylic acid, halo, nitro, cyano or epoxy moieties; or any two R¹ groups together may form an alkylene or
20 alkenylene chain completing a 3, 4, 5, 6, or 7-membered aromatic or alicyclic ring, which ring may optionally include one or more divalent nitrogen, sulfur or oxygen atoms;

and where in Formula II:

- 25 R² is a polymeric unit selected from styrene, substituted styrene, vinyls, vinyl aromatics, acrylates, methacrylates, and combinations thereof;

a is an integer from about 1 to about 10; and

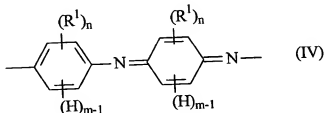
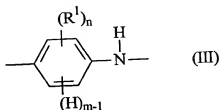
b is a number sufficient to give a molecular weight greater than 100,000;

- (b) adding an oxidizing agent to the aqueous solution to form a
30 reaction mixture;

(c) isolating a resulting polyaniline/second polymer complex from the reaction mixture; and

(d) adding water to the resulting polyaniline/second polymer complex from step (c) to form a dispersion of a desired concentration.

12. A composition comprising a polyaniline complexed with a second polymer having a high molecular weight, the polyaniline comprising aniline monomer units, each of the aniline monomer units having a formula selected from Formula III below and Formula IV below, the second polymer having Formula II below:



where in Formulae III and IV:

- 20 n is an integer from 0 to 4;
 m is an integer from 1 to 5, with the proviso that $n + m = 5$; and
 R^1 is independently selected so as to be the same or different at each occurrence and is selected from alkyl, alkenyl, alkoxy, cycloalkyl, cycloalkenyl, alkanoyl, alkythio, aryloxy, alkylthioalkyl, alkylaryl, arylalkyl, amino, alkyldiamino, dialkylamino, aryl, alkylsulfinyl, alkoxyalkyl, alkylsulfonyl, arylthio, arylsulfinyl, alkoxy carbonyl, arylsulfonyl, carboxylic acid, halogen, cyano, or alkyl substituted with one or more of sulfonic acid, carboxylic acid, halo, nitro, cyano or epoxy moieties; or any two R^1 groups together may form an alkylene or alkenylene chain completing a 3, 4, 5, 6, or 7-membered aromatic or alicyclic

ring, which ring may optionally include one or more divalent nitrogen, sulfur or oxygen atoms;

and where in Formula II:

R² is a polymeric unit selected from styrene, substituted styrene, vinyls,

- 5 vinyl aromatics, acrylates, methacrylates, and combinations thereof;

a is an integer from about 1 to about 10; and

b is a number sufficient to give a molecular weight greater than 100,000.

- 10 13. The composition of Claim 12, wherein the composition is an aqueous dispersion having a concentration of 0.1 to 5.0 % by weight of the polyaniline/second polymer complex, based upon the total weight of the aqueous dispersion.

- 15 14. The composition of Claim 12, wherein the composition is an aqueous dispersion having a concentration of 0.5 to 2.0 % by weight of the polyaniline/second polymer complex, based upon the total weight of the aqueous dispersion.

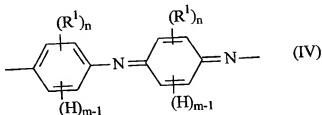
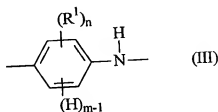
- 20 15. The composition of Claim 12, wherein the polyaniline contains at least 50 of the monomer units.

- 25 16. The composition of Claim 12, wherein the second polymer is selected from styrene and substituted styrene sulfonic acid polymers; sulfonated vinylaromatic polymers; vinyl sulfonic acid polymers; sulfonated acrylate polymers; sulfonated methacrylate polymers and copolymers on or more of styrene and substituted styrene sulfonic acid polymers; sulfonated vinylaromatic polymers; vinyl sulfonic acid polymers; sulfonated acrylate polymers; sulfonated methacrylate polymers.

- 30 17. The composition of Claim 12, wherein the second polymer is selected from poly(styrenesulfonic acid), poly(2-methylstyrene sulfonic acid), poly(4-phenylstyrene sulfonic acid), and sulfonated poly(alpha-vinyl naphthalene); poly(vinyl sulfonic acid); sulfonated poly(vinyl benzoate); sulfonated poly(benzyl acrylate) and sulfonated poly(benzyl methacrylate).

- 35 18. An organic electronic device having at least one layer comprising a polyaniline complexed with a second polymer having a high molecular weight, the polyaniline having monomer units, each of the aniline monomer units having a

formula selected from Formula III below and Formula IV below, the second polymer having Formula II below:



where in Formulae III and IV:

n is an integer from 0 to 4;

m is an integer from 1 to 5, with the proviso that n + m = 5; and

R¹ is independently selected so as to be the same or different at each occurrence and is selected from alkyl, alkenyl, alkoxy, cycloalkyl, cycloalkenyl, alkanoyl, alkylthio, aryloxy, alkylthioalkyl, alkylaryl, arylalkyl, amino, alkylamino, dialkylamino, aryl, alkylsulfinyl, alkoxyalkyl, alkylsulfonyl, arylthio, arylsulfinyl, alkoxycarbonyl, arylsulfonyl, carboxylic acid, halogen, cyano, or alkyl substituted with one or more of sulfonic acid, carboxylic acid, halo, nitro, cyano or epoxy moieties; or any two R¹ groups together may form an alkylene or alkenylene chain completing a 3, 4, 5, 6, or 7-membered aromatic or alicyclic ring, which ring may optionally include one or more divalent nitrogen, sulfur or oxygen atoms;

and where in Formula II:

R² is a polymeric unit selected from styrene, substituted styrene, vinyls, vinyl aromatics, acrylates, methacrylates, and combinations thereof;

a is an integer from about 1 to about 10; and

b is a number sufficient to give a molecular weight greater than 100,000.

19. The device of Claim 18, wherein the polyaniline contains at least 50 of the monomer units.

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20. The device of Claim 18, wherein the second polymer is selected from styrene and substituted styrene sulfonic acid polymers; sulfonated vinylaromatic polymers; vinyl sulfonic acid polymers; sulfonated acrylate polymers; sulfonated methacrylate polymers and copolymers on or more of styrene and substituted

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styrene sulfonic acid polymers; sulfonated vinylaromatic polymers; vinyl sulfonic acid polymers; sulfonated acrylate polymers; sulfonated methacrylate polymers.

21. The device of Claim 18, wherein the second polymer is selected from poly(styrenesulfonic acid), poly(2-methylstyrene sulfonic acid), poly(4-phenylstyrene sulfonic acid), and sulfonated poly(alpha-vinyl naphthalene); poly

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(vinyl sulfonic acid); sulfonated poly(vinyl benzoate); sulfonated poly(benzyl acrylate) and sulfonated poly(benzyl methacrylate).

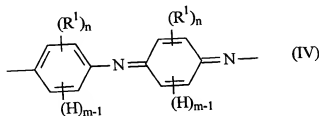
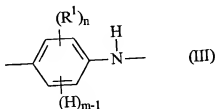
22. An organic electronic device comprising an anode layer (110); a

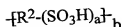
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conductive layer (120); an organic active layer (130); and a cathode layer (150); wherein the conductive layer (120) comprises a polyaniline complexed with a

25

second polymer having a high molecular weight, the polyaniline having monomer units each having a formula selected from Formula III below and Formula IV below, the second polymer having Formula II below:





(II)

where in Formulae III and IV:

- 5 n is an integer from 0 to 4;
m is an integer from 1 to 5, with the proviso that $n + m = 5$; and
R¹ is independently selected so as to be the same or different at each occurrence and is selected from alkyl, alkenyl, alkoxy, cycloalkyl, cycloalkenyl, alkanoyl, alkythio, aryloxy, alkylthioalkyl, alkylaryl, arylalkyl, amino, alkyldiamino, dialkylamino, aryl, alkylsulfinyl, alkoxyalkyl, alkylsulfonyl, arylthio, 10 arylsulfinyl, alkoxy carbonyl, arylsulfonyl, carboxylic acid, halogen, cyano, or alkyl substituted with one or more of sulfonic acid, carboxylic acid, halo, nitro, cyano or epoxy moieties; or any two R¹ groups together may form an alkylene or alkenylene chain completing a 3, 4, 5, 6, or 7-membered aromatic or alicyclic ring, which ring may optionally include one or more divalent nitrogen, sulfur or 15 oxygen atoms;
and where in Formula II:
R² is a polymeric unit selected from styrene, substituted styrene, vinyls, vinyl aromatics, acrylates, methacrylates, and combinations thereof;
20 a is an integer from about 1 to about 10; and
b is a number sufficient to give a molecular weight greater than 100,000.
23. The device of Claim 21, wherein the organic active layer is a light-emitting layer.
- 25 24. The device of Claim 21, wherein the conductive layer has a conductivity of from 10⁻⁸ S/cm to 10 S/cm.
25. The device of Claim 21, further comprising a layer (140) between the 30 organic active layer and the cathode to facilitate electron transport.
26. The device of Claim 25, wherein the layer (140) is selected from tris(8-hydroxyquinolato)aluminum; phenanthroline-based compounds, such as 2,9-dimethyl-4,7-diphenyl-1,10-phenanthroline; 4,7-diphenyl-1,10-phenanthroline (DPA); 2-(4-biphenyl)-5-(4-t-butylphenyl)-1,3,4-oxadiazole; and 3-(4-biphenyl)-4-phenyl-5-(4-t-butylphenyl)-1,2,4-triazole.

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27. The device of Claim 21, wherein the polyaniline contains at least 50 of the monomer units.

28. The device of Claim 21, wherein the second polymer is selected from
5 styrene and substituted styrene sulfonic acid polymers; sulfonated vinylaromatic polymers; vinyl sulfonic acid polymers; sulfonated acrylate polymers; sulfonated methacrylate polymers and copolymers on or more of styrene and substituted
styrene sulfonic acid polymers; sulfonated vinylaromatic polymers; vinyl sulfonic acid polymers; sulfonated acrylate polymers; sulfonated methacrylate polymers.

10 29. The device of Claim 21, wherein the second polymer is selected from
poly(styrenesulfonic acid), poly(2-methylstyrene sulfonic acid), poly(4-phenylstyrene sulfonic acid), and sulfonated poly(alpha-vinyl naphthalene); poly
15 (vinyl sulfonic acid); sulfonated poly(vinyl benzoate); sulfonated poly(benzyl acrylate) and sulfonated poly(benzyl methacrylate).

30. The device of Claim 21, wherein the conductive layer (120) comprises a complex made by the process of Claim 1.

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